APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/537,334	03/29/2000	Alexander C. Loui	79676DMW	6591

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EXAMINER
LAROSE, COLIN M

ART UNIT	PAPER NUMBER
2623	

DATE MAILED: 02/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	09/537,334	LOUI ET AL.
	Examiner	Art Unit	
	Colin M. LaRose	2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 September 2004*.

2a)☐ This action is **FINAL.**   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle,* 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *3-6,8-17,20-23,26-28,30,31,33 and 34* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *8-17* is/are allowed.

6)☒ Claim(s) *3-6,20-23,26-28,30,31,33 and 34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

    1.☐ Certified copies of the priority documents have been received.

    2.☐ Certified copies of the priority documents have been received in Application No. _____.

    3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
    application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date *0904*.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1.   A request for continued examination under 37 CFR 1.114, including the fee set forth in

37 CFR 1.17(e), was filed in this application after final rejection. Since this application is

eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e)

has been timely paid, the finality of the previous Office action has been withdrawn pursuant to

37 CFR 1.114. Applicant's submission filed on 16 September 2004 has been entered.

Claim Objections

2.   The following sections of 37 CFR §1.75(a) and (d)(1) are the basis of the following

objection:

> (a)   The specification must conclude with a claim particularly pointing out
> and distinctly claiming the subject matter which the applicant regards as his
> invention or discovery.

> (d)(1)   The claim or claims must conform to the invention as set forth in
> the remainder of the specification and the terms and phrases used in the
> claims must find clear support or antecedent basis in the description so
> that the meaning of the terms in the claims may be ascertainable by
> reference to the description.

3.   Claims 3-6, 30, and 34 are objected to under 37 CFR §1.75(a) and (d)(1) as failing to

particularly point out and distinctly claim the subject matter that the applicant regards as the

invention.

        Regarding claims 30 and 34, the claims recite "a foreground area" and then improperly

refer to "the foreground <u>areas</u>." Correction is required. Claims 3-6 depend from claim 30 and are

objected to for the same reason.

Claim Rejections - 35 USC § 103

4.   The text of those sections of Title 35, U.S. Code not included in this action can be found

in a prior Office action.

5.   Claims 30 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S.

Patent 5,644,765 by Shimura in view of U.S. Patent 6,584,221 by Moghaddam et al.

("Moghaddam") and U.S. Patent 5,805,215 by Mizoguchi.

Regarding claims 30 and 34, Shimura discloses a method/computer program (figure 4)

for detecting duplicate (i.e. substantially similar) images comprising the steps of:

providing at least two images captured at determinable times from original scenes (figure

2: image 20 and database of images 33 are provided; figure 2, elements 43, 12, and 32 and

column 4, lines 1-9: additional information, such as date and time of registration, is associated

with each of the images and denote determinable times of capture);

computing an indication of image content for each image by dividing each image into

blocks, computing an indication of image content in each block (e.g. number of black pixels in

each block comprises a "feature" that indicates the image content; column 3, lines 33-37), and

comparing the computed indication of image content in each corresponding block for the two

images to generate a similarity metric for each block (32, figure 5 and 52, figure 2: the features

of corresponding blocks (i.e. the computed indications) of the images are compared to generate

similarity metric);

determining the time of original capture of each of the images (figure 4, S13: additional

information (e.g. time of registration) is determined for each image); and

evaluating the similarity metrics and the time of original capture (figure 4, S16 and S18)

to determine whether the images are duplicate images (i.e. whether the images are substantially

similar with regards to the content of the image blocks and the time of registration);

Shimura computes the indication of image content in each block and generates a

similarity metric for the entire image by comparing the indications (features) for each block in

the image to those stored in the database.

However, Shimura does not appear to disclose assigning two or more predetermined

blocks to represent a foreground area, and then computing an indication of image content in the

foreground area to generate a similarity metric for the foreground area.

Moghaddam discloses a method for retrieving an image from a database by comparing

histograms of an input image to histograms of images stored in a database. In particular,

Moghaddam discloses partitioning an input image into a plurality of blocks and computing an

indication of image content (i.e. an histogram) for each block (see figure 2). Then, a user is

allowed to select a region of interest comprising a number of predetermined blocks to represent

an object of interest (i.e. a foreground area) (see figure 3). The histogram of the region of interest

is computed and matched to the histograms of database images for similarity. Column 3, line 53

through column 4, line 44.

It would have been obvious to one of ordinary skill in the art at the time of the invention

to modify Shimura by Moghaddam to compute the indication of image content for two or more

predetermined blocks representing a foreground area of interest and to generate a similarity

metric for the foreground area, as claimed, since Moghaddam teaches that allowing a user to

select a foreground area of interest to be matched to a database provides the user with "a more

powerful retrieval tool," wherein the user is able to specify a particular region of high interest to

be retrieved rather then simply attempting to retrieve an entire image. Column 1, lines 58-67.

Shimura teaches inputting the images using a scanner 11 (or the like), figure 1.

Shimura is silent to using a photographic camera to capture the images.

Mizoguchi discloses a photographic camera having the ability to store additional time

data along with the images captured by the camera (1, figure 1). The time/date of capture is

encoded in memory 51 (figure 10) with each image provided by the camera (column 6, lines 57-

65). The date/time information is then used as criteria for retrieving images (column 8, lines 7-

28).

It would have been obvious to one of ordinary skill in the art at the time of the invention

to modify Shimura and Moghaddam by Mizoguchi to utilize Mizoguchi's photographic camera

to input images and the time of capture of the images, since Mizoguchi's camera functions as an

image input device in substantially the same fashion (i.e. to provide an electronic representation

of an object) as Shimura's image input device 11, and Mizoguchi's camera eliminates the need

for the user to manually input the time of capture of the image.

6.   Claims 3-6 and 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over

U.S. Patent 5,644,765 by Shimura et al. ("Shimura") in view of U.S. Patent 6,584,221 by

Moghaddam et al. ("Moghaddam") and U.S. Patent 5,805,215 by Mizoguchi, as applied to claim

30, and further in view of U.S. Patent 6,400,853 by Shiiyama.

Regarding claims 3, 4, 20, and 21, neither Shimura nor Moghaddam expressly disclose dividing the images into 4x4 or 3x3 blocks. However, at the time the invention was made, dividing an image into a small number of blocks and processing each block was common in the art and would have been an obvious modification to those skilled in the art.

As Shiiyama shows (figure 5), it is conventional to divide an image into 3x3 blocks for the purposes of determining the similarity between images.

Regarding claims 5 and 22, Shimura and Moghaddam disclose the indication of image content in each block comprises computing an histogram for each block. Shimura computes a simple histogram as the number of black pixels (column 3, lines 34-37), and Moghaddam computes a joint histogram of each block (see column 3, lines 64-65).

Regarding claims 6 and 23, Shimura and Moghaddam disclose the similarity metrics are histogram intersection metrics – Shimura compares simple histograms, comprising the number of black pixels, for corresponding blocks to determine the intersection, or similarity, of the blocks, and Moghaddam uses conventional histogram intersection metrics to determine the similarity (see column 4, lines 45-60). Shimura also discloses using the time difference between capture of the two images to determine whether the images are duplicate images. Figure 4, S13: time information of the two images is compared; figure 4, S17: features of the two images are compared. Both criteria are used to determine the similarity of the images.

7.   Claims 27, 31, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,644,765 by Shimura in view of U.S. Patent 6,584,221 by Moghaddam et al.

("Moghaddam"), "Indexing Via Color Histograms" by Swain et al. ("Swain"), and U.S. Patent

5,805,215 by Mizoguchi.

Regarding claims 31 and 33, Shimura discloses a method (figure 4) for detecting

duplicate (i.e. substantially similar) images comprising the steps of:

providing at least two images captured at determinable times from original scenes (figure

2: image 20 and database of images 33 are provided; figure 2, elements 43, 12, and 32 and

column 4, lines 1-9: additional information, such as date and time of registration, is associated

with each of the images and denote determinable times of capture);

computing an indication of image content for each image by dividing each image into

blocks, computing an indication of image content in each block (e.g. number of black pixels in

each block comprises a "feature" that indicates the image content; column 3, lines 33-37), and

comparing the computed indication of image content in each corresponding block for the two

images to generate a similarity metric for each block (32, figure 5 and 52, figure 2: the features

of corresponding blocks (i.e. the computed indications) of the images are compared to generate

similarity metric);

determining the time of original capture of each of the images (figure 4, S13: additional

information (e.g. time of registration) is determined for each image); and

evaluating the similarity metrics and the time of original capture (figure 4, S16 and S18)

to determine whether the images are duplicate images (i.e. whether the images are substantially

similar with regards to the content of the image blocks and the time of registration);

wherein the step of evaluating the similarity metric for each block and the time of capture

comprises comparing one or more blocks of one image, using an histogram intersection metric

to corresponding blocks of another image and using the difference between capture of the two images to determine whether the images are duplicate images (i.e. Shimura utilizes the additional information indicating the time of capture and the intersection, or comparison, of features of corresponding blocks of pixels – the features comprising the number of black pixels (i.e. an histogram of black pixels) – to determine whether tow images are duplicates).

Shimura does not disclose utilizing the claimed equation to compute the similarity of image blocks.

Moghaddam discloses a method for retrieving an image from a database by comparing histograms of an input image to histograms of images stored in a database. In particular, Moghaddam discloses partitioning an input image into a plurality of blocks and computing an indication of image content (i.e. an histogram) for each block (see figure 2). The histograms of the blocks are matched to the histograms of database images for similarity. Moghaddam utilizes conventional histogram intersection metrics, such as that of Swain et al., for comparing the histograms of corresponding blocks. Column 3, line 53 through column 4, line 44.

Swain discloses the conventional method of histogram intersection utilized by Moghaddam. Swain's histogram intersection metric $H(I,M)$ in §2.1 on page 391 is the same as the claimed metric.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Shimura by Moghaddam and Swain to utilize the claimed histogram intersection metric since Moghaddam discloses that, for the purposes of determining the similarity of image blocks on the basis of histograms, it is both preferred and conventional to utilize Swain's metric.

Shimura teaches inputting the images using a scanner 11 (or the like), figure 1.

Shimura is silent to using a photographic camera to capture the images.

Mizoguchi discloses a photographic camera having the ability to store additional time

data along with the images captured by the camera (1, figure 1). The time/date of capture is

encoded in memory 51 (figure 10) with each image provided by the camera (column 6, lines 57-

65). The date/time information is then used as criteria for retrieving images (column 8, lines 7-

28).

It would have been obvious to one of ordinary skill in the art at the time of the invention

to modify Shimura and Moghaddam by Mizoguchi to utilize Mizoguchi's photographic camera

to input images and the time of capture of the images, since Mizoguchi's camera functions as an

image input device in substantially the same fashion (i.e. to provide an electronic representation

of an object) as Shimura's image input device 11, and Mizoguchi's camera eliminates the need

for the user to manually input the time of capture of the image.

Regarding claim 27, Shimura teaches inputting additional information (12 and 43, figure

1) of input images, such as the date of capture, using a keyboard, but is silent to determining the

time of capture by extracting encoded time information from images provided by a digital

camera. That is, Shimura does not disclose how the time information is acquired, only that it is

input.

Mizoguchi discloses storing additional time data with images captured using a digital

camera (1, figure 1). The time/date of capture is encoded in memory 51 (figure 10) with each

image provided by the camera (column 6, lines 57-65). The date/time information is then used as criteria for retrieving images (column 8, lines 7-28).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Shimura by Mizoguchi to extract time information from images provided by a digital camera and input the extracted time information using Shimura's additional-information input units (43 and 12, figure 12) since Mizoguchi teaches that information pertaining to the time of capture is stored with the image at the time of capture, and said time information is extracted, or otherwise accessed, for determining the time of capture.

8.   Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,644,765 by Shimura in view of U.S. Patent 6,584,221 by Moghaddam et al. ("Moghaddam"), "Indexing Via Color Histograms" by Swain et al. ("Swain"), and U.S. Patent 5,805,215 by Mizoguchi, as applied to claim 33, and further in view of U.S. Patent 4,143,956 by Miyagawa.

7.   Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shimura in view of Mizoguchi and U.S. Patent U.S. Patent 4,143,956 by Miyagawa.

Regarding claim 26, Shimura teaches inputting additional information (12 and 43, figure 1) of input images, such as the date of capture, using a keyboard, but is silent to determining the time of capture by extracting encoded time information from a film strip used to capture the images. That is, Shimura does not disclose how the time information is acquired, only that it is input.

Miyagawa discloses storing additional time data onto a film strip used to capture an

image (column 1, lines 34-39). The time data indicates the time/date at which the image was

captured by the camera.

It would have been obvious to one of ordinary skill in the art at the time of the invention

to modify Shimura and Mizoguchi by Miyagawa to extract time information from a film strip

used to capture an image and input the extracted time information using Shimura's additional-

information input units (43 and 12, figure 12) since Miyagawa teaches that information

pertaining to the time of capture is stored on the film strip at the time of capture, and said time

information is extracted, or otherwise accessed, for determining the time of capture.

9.   Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent

5,644,765 by Shimura in view of U.S. Patent 6,584,221 by Moghaddam et al. ("Moghaddam"),

"Indexing Via Color Histograms" by Swain et al. ("Swain"), and U.S. Patent 5,805,215 by

Mizoguchi, as applied to claim 33, and further in view of U.S. Patent 6,163,622 by Abdel-

Mottaleb et al. ("Abdul-Mottaleb").

Regarding claim 28, Shimura discloses evaluating the similarity metric and the time of

capture to determine whether the images are duplicates but is silent to the steps of generating an

average of the similarity metrics for the blocks and evaluating the average of the similarity

metrics as claimed.

Abdel-Mottaleb discloses a system that determines the similarity between images. In a

method similar to that of Shimura, Abdel-Mottaleb, divides the images into blocks and computes

an indication of image content for each block (figure 3). Then, for the purposes of determining

the similarity between two images, Abdel-Mottaleb discloses generating an average of the similarity metrics for the blocks (equation (8), column 7). The average of the similarity metrics $S^\wedge_K$ is then used for evaluating the similarity between the images.

It would have been obvious to one of ordinary skill in the art at the time of the invention to generate and evaluate the average of similarity metrics for the blocks as claimed since Abdel-Mottaleb teaches that using an average (i.e. the median) of block similarities avoids the problem of too much emphasis being placed on any one of the block similarities (column 7, lines 38-50).

Allowable Subject Matter

10.   Claims 8-17 are allowable.

Conclusion

11.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent 6,721,449 by Krishnamachari

U.S. Patent 5,796,428 by Matsumoto et al.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Colin M. LaRose whose telephone number is (703) 306-3489. The examiner can normally be reached Monday through Thursday from 8:00 to 5:30. The examiner can also be reached on alternate Fridays.
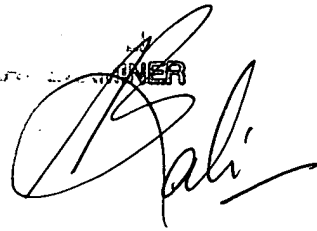
If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Amelia Au, can be reached on (703) 308-6604. The fax phone number for the

organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding

should be directed to the TC 2600 Customer Service Office whose telephone number is (703)

306-0377.

CML
Group Art Unit 2623
16 February 2005

PRIMARY EXAMINER

VIKKRAM BALI
PRIMARY EXAMINER